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THE

WHEAT SUPPLY.

A REPLY TO OBJECTIONS MADE

IN THE

LONDON TIMES

TO CERTAIN ESTIMATES SUBMITTED AT THE MEETING OF THE BRITISH
ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,
SEPTEMBER, 1887.

BY EDWARD ATKINSON,

OF BOSTON, MASS., U. S. A.

NEW YORK:
1888.

INTRODUCTION.

The two letters upon the conditions on which this country competes with ndia in the supply of wheat, and other matters, which are reprinted in this pamphlet rom *Bradstreet's* of New York, were sent to that paper and to the *Times* of London at the same date in order that they might appear on or about the 17th of February in both journals, arrangements having been made for advice by telegraph of their publication in London. After waiting for such advice from London until March 2 the publication of the letters in *Bradstreet's* was thought to be expedient without further delay. E. A.

Boston, *March* 5, 1888.

THE WHEAT SUPPLY.

I.

To the Editor of BRADSTREET'S.

DEAR SIR—At the meeting of the British Association for the Advancement of Science, held in Manchester in September last, I had the honor of addressing Section F upon the silver question. In this address I had occasion to refer incidentally to the competition of East India with America in supplying Great Britain with wheat. I made a guarded statement from memory to the effect that since the years immediately preceding the so-called demonetization of silver by Germany in 1873, when the price of wheat in Mark Lane was about 50s. per quarter, there had been such changes in the cost of production and in the distribution of wheat in the United States as to make it practically certain that at the present time 34s. per quarter would yield as good results to the American farmer 1,500 miles from the seaboard as 50s. did then. As I had no books of reference at hand, I did not attempt to give the exact averages at either period. The price of wheat for a term of years had been somewhat above 50s. in England prior to 1873, although in 1870 it was below, while the price at the time of my address was below 34s. The fact which I wished to bring out was that a reduction of at least 16s. per quarter had occurred with respect to American wheat, in the cost of production and distribution. I computed by memory the reduction in the cost of transportation from the present center of the wheat fields to the seaboard of the United States at ¾c. a ton a mile, which represents a saving on one ton of 33⅓ bushels, 60 pounds each, of 33¾c. per bushel. This reduction on freight by railway at eight bushels per quarter comes to $2.70, or a fraction over 11s., on a haul of 1,500 miles. I then stated that during the same period the cost of moving grain from Boston or New York to Liverpool by steamer had been reduced at least 2s. per quarter. I also said that I believed that the improvements in planting, harvesting, handling and milling grain had reduced the cost at least 3s. more—say 16s. in all, which sum being deducted from 50s. would leave 34s. On this showing the latter price would be as remunerative now as 50s. was at the previous time, and would justify the expectation of a continuous supply of wheat from the United States. I added that if I had been rightly informed the supply from India would be checked at or below that price. I was aware that wheat was then selling in Mark Lane at a less price; I only had in mind the competition of India on a silver basis with the United States now on a gold basis or standard.

This statement, as submitted to the association, excited many adverse comments, especially from several correspondents of the London *Times*. It was contested at all points, not so much with reference to India as in its bearing upon the agriculture of Great Britain. It was alleged,

1st. That the computation itself could not be sustained in its details.

2d. That the wheat farms of America were generally in a very bad and degenerating condition.

3d. That the farmers of the west, as a body, were tending toward bankruptcy, or were being eaten up by heavy mortgages.

4th. That at the first period named, to wit, in 1870, 1871 and 1872, wheat was not brought to the sea by all-rail routes so long a distance as 1,500 miles, etc., etc.

5th. That the production of wheat must have been unprofitable, because since 1880 the crop had not increased in proportion to the increase of population of the United States.

It would have been not only dishonest but in exceedingly bad taste on my part had I made statements in a scientific discussion before the British Association which could not be sustained, and it has not been altogether pleasant to have them questioned in this manner. I have therefore felt it incumbent upon myself to make an investigation since my return to America, from which I have established the following facts.

In respect to the alleged bankrupt condition of western farmers, I have received returns from the books of fifteen land or mortgage security companies or firms which have lent eastern money upon western farms from a period ranging from two and one-half to thirty-eight years. I know from personal knowledge how well and safely a portion of these companies are managed; of the rest I know but little; but, as the replies to my questions from all the companies consulted are substantially uniform and concurrent with those given by the companies which I know to be well managed, I think that the conclusions reached from the compilation of all their statements may be accepted as the truth. These returns, omitting fractions, cover two hundred and fifty thousand (250,000) mortgages, amounting to two hundred and thirty-four million dollars ($234,000,000), averaging a little over $900 lent on each mortgage. One hundred and thirty-three thousand five hundred (133,500) of these mortgages have been paid, amounting to one hundred and ten million five hundred thousand dollars ($110,500,000); one hundred and sixteen thousand five hundred (116,500) are still outstanding. The foreclosures have been few; not one per cent. in point of number of the whole number negotiated. There have been a few losses in particular cases; but, as a whole, the sale of land taken on foreclosure has paid a profit. The net aggregate result is "*no loss.*" The number of foreclosures outstanding at the present time is unusually small; the interest is being promptly met; all the comments, statements and conditions point to prosperity among the farmers, rather than to adversity.

I have addressed questions to many manufacturers and merchants and have obtained similar replies, and have deduced similar conclusions from the facts given by the dealers in agricultural implements and by some of the largest general traders who supply the wheat-growing country with goods of all kinds.

The reduction in the rate of interest on money lent to the farmer has been, substantially, from 20 per cent. per annum plus a commission at the earliest date to 6 per cent. minimum without the commission at the present time. The rates named in the replies vary according to the experience and age of the company, and the place, state or territory where the property is on which the money is lent; the average rate to-day may be taken at 6½ to 7 per cent.; the average rate twenty years ago, at 10 to 12 per cent., or even 15 per cent. The rate being lowest where the laws of the state are the safest for both creditor and debtor, and where the state or public credit is unimpaired.

In regard to the cost of transportation, I have received from the president of the New York Central Railroad a carefully prepared statement of the actual rates which have been charged on grain and flour separately from other merchandise, year by year for twenty years. The reduction since 1870, 1871, and 1872, *east* of Chicago, has been seven-tenths of a cent per ton per mile; *west* of Chicago it has been greater. The city of Minneapolis is 400 miles west from Chicago; it is now the centre of the wheat trade of the northwest; it had a large traffic in grain and flour prior to 1873; the grain crop of Minnesota, Dakota and Nebraska has been mainly tributary to Minneapolis. In 1869 to 1872 the product of these territories (Dakota being then unsettled) and of Kansas averaged 22,000,000 bushels annually. From 1883 to 1886 it averaged 108,000,000 bushels. Over 4,000 miles of new railways have been constructed in the year 1887 in Minnesota, Dakota, Nebraska and Kansas, out of 13,000 miles in the whole country. A large proportion of their grain or of the flour made therefrom in 1872 and 1873 was and is now moved by all-rail routes. The reduction in the rate of traffic west of Chicago to Minneapolis I have not obtained on grain separately; but it can be implied from the general traffic returns, grain having always been carried at lower charges than general merchandise. The rate west of Chicago was and is higher than it is east, but the reduction from the rate charged at the earlier period has been greater beyond Chicago, since the railway system west of Chicago had not, in 1870, 1871, and 1872, been as well organized as it was toward the east. My statement that the through rate on grain for a distance of 1,500 miles had been reduced since 1870, 1871, and 1872, "three-fourths of a cent per ton per mile" on the whole distance, is, therefore, fully sustained. The reduction on a quarter of wheat comes to a fraction over 11s. per quarter on a haul of 1,500 miles.

In regard to ocean traffic, I have obtained statements of their traffic charges from the largest shippers of grain. I find that the reduction between the two periods under consideration has been not 2s. per quarter, as stated by me, but 4s.

The substitution of flour in sacks for wheat makes another gain in the freight charge of 1s. per quarter, if rated on the wheat.

The charges for elevating, handling and the like, have been reduced at least 1s. per quarter, and the reduction in the cost of milling, including the substitution of sacks for barrels, has been at least 3s.

The substitution of the sack, now costing 13c. for the barrel, which cost 50c. in 1872, makes a saving which being rated on the wheat required to make 196 pounds of flour, of a fraction over 8c. per bushel, which is a little more than 2s. 6d. per quarter on the single element in the cost of flour for export. Barrels are still used in the home trade.

I have submitted these computations for verification to the editor of BRADSTREET'S, who gives me the following statement in reply:

"Taking the official reports of railway, lake and canal freights for fifteen years, Chicago to New York, with rates on grain from New York to Liverpool for a like period, I find that the reduction in cost of moving one bushel of wheat from Chicago to New York, 1870–72 to 1887, has been (1) by lake and canal, about 18c.; (2) by lake and rail, 22⁴/₅c.; and (3) by all-rail lines, 30c. About 60 per cent. of the Atlantic coast wheat receipts come east by rail exclusively, which would point to about 26c. decreased freight charges per bushel on the total quantity sent east, calculated on the Chicago-New

York rate. Handling charges (elevating, weighing, bagging and sewing) have been reduced within fifteen years 1¼c. per bushel at Chicago, ½c. at Buffalo and 1¼c. at New York, a total saving of 3c. per bushel. Adding these reductions in cost of moving one bushel of wheat from Chicago to New York to the previously calculated reduction in ocean freight charges and we have the following:

BRADSTREET'S calculated reduction cost of transportation on wheat, Chicago to New York, 1870-72 to 1887	26c.
BRADSTREET'S reported reduction handling charges	3
BRADSTREET'S reported reduction ocean freights	8
Total saving in transporting one bushel wheat, Chicago to Liverpool, 1870-72, compared with 1887	37

It will be observed that this computation from BRADSTREET'S of saving in moving wheat is limited to the distance between Chicago and New York, a little less than one thousand miles. Minneapolis, in Minnesota, is now the great center of milling for the wheat of the northwest; it is in round figures four hundred miles west of Chicago. If we compute the reduction of railway charge west only at the rate east of Chicago we get the following result: 26c. from Chicago corresponds to $36\frac{4}{10}$c. from Minneapolis. At eight bushels to a quarter of wheat this comes to $2,91, which is substantially 12s. a quarter on 1,400 miles. This statement therefore more than sustains my own computation of a saving of 11s. on 1,500 miles, and would warrant me in placing it at 13s.

I will suggest to my critics who have asked whether wheat was moved 1,500 miles by rail for export prior to 1873, to compute the crops of the trans-Mississippi states and territories in the table of crops given below, and to measure the distances for themselves. Suffice it that the great gain in production since 1872, in the face of falling prices, has been in sections which are more than 1,500 miles from the seaboard, whence the greater portion is moved by all-rail routes to the seaboard or to the centers of distribution for final consumption.

In regard to improvements in production: In 1876 the self-binder was successfully attached to the reaper; 100,000 self-binding reapers are now made and sold each year for use in this country. The twine required to bind an average annual wheat crop weighs more than 30,000 tons. Each self-binding reaper has displaced the work of seven to eight men, who formerly followed each reaper to bind the sheaves by hand; the cost of binding by hand was 5c. to 6c. per bushel in 1870, 1871 and 1872; the cost of binding automatically with twine now does not exceed 1½c. per bushel, including the price of the material, the repairs of the machines, and other matters. The saving in reaping and binding has been at least 1s. 4d., and may be computed on the average at 1s. 6d. per quarter. The price of the self-binding reaper has diminished from $300 to $350 dollars each at the beginning to an average of $160 now. Yet some of the great fortunes of the day have been made by the manufacturers and patentees of reapers or harvesters. There has been nearly an equal gain to the farmer in the application of improved planters, plows and other implements, of which I can obtain as yet no exact measure; it cannot be less than 6d. to 8d. per quarter, and is probably more, but perhaps it might be impossible to bring this gain into actual terms of money.

Among the improvements may be named the substitution of the gang and buggy or riding plow, the disc harrow, the general adoption of the barbed-wire fence, which has brought land into use which could not be occupied with economy except for a cheap fence. Harvesters are now being largely used in the extreme northwest, similar to those which are made use of in California for heading the wheat, leaving the straw to rot upon the ground, thus saving the binding, and maintaining to some extent the fertility of the land.

During the same period, i. e., since 1872, the roller has been substituted for the millstone, and a revolution has occurred in the preparation of flour, lessening the cost of milling and improving the quality of the product. This element cannot be considered at great length; suffice it that in a given flour mill, of which I have the data, the capacity of the grindstones in 1870, 1871 and 1872 was 350 barrels a day. It has since been altered to the roller system, and the output is now 1,200 barrels per day, with a less number of men employed.

At the former date the millers were making great profits, and the bran and shorts, or "offal" of the wheat, so called, was discharged into the river. It is now saved and sold for feed at an average of $9 per ton.

At the former date the straw was mostly burned upon the field to get rid of it. As the population becomes more dense it is saved for customary purposes, or on the great prairies, where there is neither wood nor coal, it is compressed and used for fuel, being the only fuel burned in portable engines upon the field.

As I cannot accurately measure the reduction in cost which has ensued from these changes, except in a general way, I have only estimated them at not less than 3s. per quarter. It has been in fact much greater.

The sum of the reductions which I have already comes to twenty-two shillings per quarter, which being deducted from fifty shillings leaves *twenty-eight* shillings per quarter in place of *thirty-four*, thus more than sustaining my guarded analysis as given in the address to the British Association. These figures would have warranted me in saying to the British Association that *twenty-eight shillings per quarter would now yield as good results to the American farmer fifteen hundred miles from the sea-*

board as fifty shillings did prior to 1873, or if the average price of wheat in England be taken at the figures given by one of my critics for four years, 1870, 1871, 1872 and 1873, to wit, fifty-four shillings and nine pence per quarter, then deducting as above twenty-two shillings, the remainder more than sustains my original statement that thirty-four shillings would now pay the American farmer as much as he gained under the actual average of prices of the first period named, 1870 to 1873, to wit, fifty-four shillings and nine pence.

I then believed that I could have safely named 30s., but as I could not then and there give the proofs I made the higher estimate to which such unwise and ill-grounded exceptions have been taken.

SUMMARY.

Reduction in the railway charges	11s. or more
Reduction in the steamer charges	5s.
Reduction in planting and reaping	2s. or more
Reduction in milling and sacking	3s. or more
Reduction in elevating, handling, etc	1s.
Minimum reduction per quarter	22s.

I have been called upon by Mr. Morton Frewen to prove that there has been an aggregate economy of "some £5,000,000" in the freight charges between the farm and the seaboard of this country as compared with 1871, 1872 and 1873. I have already given proof of this with respect to the distance from what may now be called the center of the great wheat product of the middle section of the United States—comprising under the term middle section the states and territories of Kansas, Missouri, Nebraska, Dakota, Wisconsin and Minnesota.

A more satisfactory computation may perhaps be made in a different way. Mr. Frewen will not deny that Chicago was a great central point for the distribution of wheat by all-rail routes in the years 1870, 1871 and 1872. In round figures Chicago is 1,000 miles from the seaboard at Boston, from which much of the wheat has been sent abroad in competition with New York and Baltimore, to which ports the distance is a little less.

It may also be considered that the average haul within the limits of the United States on all the wheat which is produced, in order to move it from the point of production at the farm to the average point of consumption or export, is about 1,000 miles, probably twelve hundred. If then we take the actual reduction in the charge on the New York Central & Hudson River Railroad as given heretofore, to wit, seven-tenths of a cent. a ton per mile, the amount of such reduction is a fraction over 22c. a bushel. This comes to a fraction over 7s. per quarter on a haul of 1,000 miles, or from Chicago to Boston. I have given the total reduction in the cost of producing and distributing wheat on a haul of 1,500 miles at 22s. per quarter on our foreign exports.

PRODUCT OF WHEAT, 1869 TO 1886.

States.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
New York	9,750,000	9,133,000	9,589,000	6,712,000	7,047,000	9,161,000	5,200,000	9,750,000	12,800,000
Pennsylvania	16,500,000	17,115,000	19,339,000	11,603,000	15,548,000	16,636,000	15,200,000	18,740,000	18,200,000
Michigan	16,800,000	15,288,000	16,205,000	13,936,000	14,214,000	17,341,000	16,870,000	15,170,000	21,890,000
Ohio	20,400,000	19,150,000	18,575,000	18,203,000	18,567,000	25,993,000	17,500,000	21,750,000	26,000,000
Indiana	20,600,000	20,200,000	19,190,000	19,381,000	20,832,000	23,331,000	17,280,000	20,000,000	24,600,000
Illinois	29,200,000	27,115,000	25,216,000	24,711,000	28,417,000	30,122,000	27,300,000	23,440,000	33,000,000
Missouri	7,500,000	6,750,000	12,825,000	7,695,000	11,927,000	15,385,000	11,160,000	15,240,000	20,000,000
Kansas	2,800,000	2,343,000	2,694,000	2,155,000	4,330,000	9,455,000	12,700,000	16,510,000	14,400,000
Wisconsin	24,000,000	20,485,000	18,436,000	22,307,000	20,322,000	18,436,000	25,200,000	16,800,000	22,000,000
Minnesota	19,000,000	16,022,000	12,016,000	23,200,000	28,056,000	21,338,000	27,200,000	16,000,000	33,324,346
Iowa	23,500,000	20,445,000	18,400,000	22,080,000	34,600,000	33,908,000	29,800,000	17,600,000	37,810,000
Nebraska	1,000,000	1,848,000	1,829,000	2,560,000	3,584,000	3,619,000	3,400,000	4,330,000	5,640,000
Dakota	....	....	....	....	....	....	....	....	....
Oregon	1,750,000	2,270,000	2,292,000	2,406,000	3,127,000	4,875,000	4,500,000	4,675,000	6,875,000
California	20,000,000	14,175,000	16,757,000	25,600,000	21,504,000	28,380,000	23,800,000	30,000,000	22,000,000
All other states	47,346,900	43,540,700	37,359,400	47,448,100	43,179,700	51,122,700	55,026,000	59,351,500	65,654,800
Totals	260,146,900	235,884,700	230,722,400	249,997,100	281,254,700	309,102,700	292,136,000	289,356,500	364,194,146

States.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
New York	14,128,400	10,746,000	12,609,200	10,844,000	12,145,200	8,035,200	12,729,000	10,565,000	11,093,000
Pennsylvania	22,095,000	22,307,400	22,114,380	18,797,000	20,300,700	20,043,800	20,820,000	13,325,000	18,255,000
Michigan	27,889,200	28,773,120	33,155,865	21,220,000	32,315,400	25,011,000	29,772,000	31,261,000	26,572,000
Ohio	33,120,000	36,591,750	49,790,475	38,520,000	43,453,600	25,884,000	41,186,000	20,593,000	40,362,000
Indiana	33,136,000	43,709,960	49,766,758	31,353,000	45,461,800	28,447,800	33,745,000	26,659,000	40,255,000
Illinois	31,620,000	44,896,830	60,958,757	26,822,000	52,302,900	22,150,000	32,374,000	10,683,000	27,562,000
Missouri	20,196,000	26,801,600	29,563,134	20,399,000	27,538,600	23,819,300	27,500,000	11,275,000	21,986,000
Kansas	27,221,000	18,089,500	20,336,000	19,909,000	31,248,000	26,851,100	34,990,000	11,197,000	14,556,000
Wisconsin	21,154,400	20,565,720	16,654,735	17,987,000	23,145,400	19,604,900	20,083,000	15,665,000	14,725,000
Minnesota	28,824,000	31,886,520	40,395,696	35,952,000	33,030,500	33,773,200	41,307,000	34,285,000	42,856,000
Iowa	30,440,960	32,786,880	33,178,205	18,248,000	25,487,200	27,518,800	31,270,000	30,332,000	32,455,000
Nebraska	13,872,900	13,043,590	12,922,677	13,840,000	18,300,000	27,481,300	28,325,000	19,828,000	17,449,000
Dakota	....	....	....	....	11,460,000	16,128,000	22,330,000	27,913,000	30,704,000
Oregon	7,665,000	8,188,800	11,734,420	12,673,000	12,039,300	13,122,400	15,462,000	13,916,000	11,133,000
California	41,990,000	35,000,000	33,877,600	31,406,000	36,046,600	36,322,000	44,320,000	26,592,000	36,165,000
All other states	66,769,540	75,368,960	71,491,966	65,310,090	79,910,270	66,893,360	76,552,000	53,023,000	71,090,000
Totals	420,122,400	448,756,630	498,549,868	383,280,090	504,185,470	421,086,160	512,765,000	357,112,000	457,218,000

If we take Chicago as the wheat center in place of Minneapolis and compute the reduction of the cost and charges on wheat within the limits of the United States only, we get the following result:

SAVING ON WHEAT TAKING CHICAGO AS THE CENTER, 1,000 MILES HAUL IN PLACE OF 1,500.

Reduction of railway charge	7s.
Reduction on planting and reaping	2
Reduction on handling and elevating	1
Reduction in milling and on cost of barrels, omitting gain in sacking, as barrels are used in the home trade	2
Minimum reduction on cost of wheat without ocean charges, per quarter	12

Twelve shillings per quarter is 1s. 6d. per bushel, or between 36c. and 37c.

The average wheat crop of the United States at the present time amounts to 55,000,000 quarters. An actual saving of 12s. per quarter in the production and internal distribution of 55,000,000 quarters comes to £33,000,000, or in round figures, one hundred and fifty million dollars ($150,000,000).

If we assume that this country may be called upon to supply the whole consumption of Great Britain with 200,000,000 bushels, or 25,000,000 quarters of wheat, the proportionate reduction on that part would be £15,000,000, in place of the £5,000,000 which I am asked to prove.

If we are called upon to supply only one-half the wheat required by Great Britain, the reduction in cost since the year 1870, 1871 and 1872 may be computed at £7,500,000 on the wheat delivered at the port of export in the United States, to which may be added the reduction on ocean steamers charges in British steamers at the rate of 4s. to 5s. per quarter, making over £10,000,000 in all, or about $50,000,000 saved to British consumers in the last fifteen years.

When one treats such a problem as this in the gross the figures are often too large to make a clear impression upon the mind. The important question is, has this reduction in cost yet been distributed equitably among those who consume the bread? That problem, however, is foreign to the present question.

One of your correspondents alleges that while there has been great increase in the crop of spring wheat the winter wheat has fallen off. This is true to some extent, but it is not wholly true; wheat may have fallen off in some of the states in which corn and meat or some other crop more profitable than wheat at a given time can be substituted; but in some of the eastern states where wheat is still an important product, to wit, in the states of New York and Pennsylvania, even this product has increased. The average wheat crop of these two states from 1869 to 1872 was 25,000,000 bushels; and from 1883 to 1886 it was 29,000,000 bushels each year. See previous table.

It is alleged that wheat cannot be made on the great farms of the northwest at 40c. a bushel "if depreciation of machinery, interest on capital and depreciation of land be included." I have obtained statements from some of the most successful "bonanza farmers," who compute the cost of cultivating and harvesting an acre of wheat at $8, *including* all these items, the average crop in a fair year being twenty bushels, in a good year twenty-two. There is ample testimony to sustain these figures.

The end is not yet. Whenever the railroads west of Chicago increase their traffic so as to enable them to work as cheaply as the lines east of Chicago, a reduction of 2s. a quarter on 400 to 500 miles of track may be made. This is practically certain to come between Minneapolis and Chicago.

New labor-saving machines are being constantly introduced; the latest is a thresher which threshes four bushels of wheat in one minute, or 2,400 in a day of ten hours; and a binder which binds automatically with a wisp of straw is said to be within probable success, thus saving the cost of twine.

It might be assumed that the lowest point of cheap transportation had been reached, but the improvement applied to the "Strong" locomotive engines, now in successful operation, has reduced the cost of fuel in ratio to power developed to that required in stationary engines of the best kind. The use of these engines is being accompanied by the construction of cars carrying thirty tons each of paying freight against fifteen tons of dead weight; this will enable short freight trains to be made up carrying a very large paying load, to be run at high speed and at lower cost than anything yet accomplished.

If these facts prove anything, they prove conclusively that the American farmer in the wheat-growing regions will himself receive as much money from his wheat when sold in London at the present time at less than 30s. per quarter as he did in the period previously named, 1870 and 1872, when it was at 50s. or more.

If it be asked how can such a price yield any profit now, the rejoinder is, how could the former price have paid him? If it did not pay him then, how can the increase in production since 1870, 1871 and 1872 be accounted for?

It may be remarked that the money which the farmer receives to-day is at least 50 per cent. greater in purchasing power with respect to tools, machines, clothing and food than it was in the first period, to wit, 1870 to 1872. The wages on the great farms are now $25, say £5, per month, with board, for the small force which is retained throughout the year, and $2 per day (say 8s.), with board, for the larger additional force required during the harvest season. Had it not been for the invention of the self-binder it would have taken a force during the harvest season of at least 160,000 men, probably more, to bind a single crop. It is difficult to see how the crops made could have been saved under such conditions, since no such number of available men could have been found for the temporary work of the short harvest season.

The inference that wheat-growing has ceased to be profitable because the specific crop of wheat has not increased ratably with the increase of population since 1880, although it has increased so much since 1870, may be, and probably is, entirely erroneous, for the reason that in many of the principal wheat-growing states it is optional with the farmer to grow either wheat, maize or Indian corn, flaxseed, oats, barley, or some other field crop. Wheat is an important crop, but it is by no means the most important crop in this country. The crop of Indian corn is the principal and most valuable product of agriculture. The hay crop is also more valuable than the wheat crop. An average crop of Indian corn at the present time ranges from 1,900,000,000 to 2,000,000,000 bushels. This year it has been cut short about 25 per cent. by drouth. It will not much exceed 1,400,000,000 bushels. The average of the wheat crop ranges from 420,000,000 to 500,000,000 bushels, according to the price of other field crops and the character of the season.

The question is not whether wheat-growing, but whether grain-growing, is specifically profitable or not.

With reference to this point the simple fact may be submitted that the per capita product of grain in the United States has increased from an average of 38 bushels per head in the years 1866, 1867 and 1868, to 40½ bushels per head in the years 1870, 1871 and 1872, and to 52 bushels per head in the years 1884, 1885 and 1886. The average wheat crop of 1870 and 1872 was 239,000,000 bushels; 1883 and 1885 was 442,000,000 bushels. Neither may it be inferred that wheat-growing does not pay the cost of production because it does not bring the sum which may be computed as its cost on a farm exclusively devoted to wheat production.

Wheat is in some sections the cash or money crop, and not infrequently whatever it brings is profit. The following statement from the books of a small farm, in which wheat is but one of the products of farming, may illustrate and explain this case:

Seed, 100 acres, 1½ bushels per acre, 150 bushels at 70c.	$105.00
Seeding, six days' work at $3.50 per day	21.00
Harrowing twice, ten days' work	35.00
Harvesting at $1 per acre	100.00
Twine, 1¾ pounds per acre, at 14c	24.50
Threshing and delivering at elevator 12½c. per bushel, 1,850 bushels	231.25
Plowing in stubble at $1.50 per acre	150.00
	$666.75

Average of four last crops, 18½ bushels per acre, cost 36c. per bushel.

It will be observed that the seed is charged at the market price and not at the cost.

If this account were made up on the basis of cost for seed, it would stand as follows:

Cost as above		$666.75
Less charge for seed		105.00
		$561.75
Average crop	1,850 bushels,	
Less seed	150 bushels,	
	1,700 bushels net at 33c	$561.00

without interest or depreciation.

The foregoing statement has been furnished me by a farmer whose product consists of a variety of crops of which wheat is but one. As the harvesting and threshing is done by the neighborhood machine on contract, it will be very apparent that the seeding and harrowing and the ploughing in of the stubble take but a very small part of the time either of the farmer or of his permanent force of men; therefore he can afford to raise this crop at a much lower cost than if his time and labor were exclusively devoted to wheat production, without any other occupation for himself, his men, or his capital during other parts of the year.

I commend these facts and figures to some of my friends whom I greatly esteem even in their errors, by whom my previous statements were questioned, and whom I recognize either by their full names or by their initials.

It may not be denied in rejoinder to their remarks that the whole system of farming has been changed in its necessary conditions during the period under treatment. There have been periods in the interval between 1870 and the present date when extravagant profits have been made upon wheat both by large and small farmers, the cost of moving having been reduced more rapidly than the price. There has therefore doubtless been a good deal of wild investment and of unskillful management, especially on the large farms, whereby some of them have become bankrupt. The small farmers have also been compelled to, or have chosen to exercise greater skill and economy in their work. There is also a tendency at the present time to follow up the success of the land mortgage companies as lenders, by urging farmers to buy more land on speculation rather than for the purpose of improving what they now have. Investors need to be very careful in the choice of their agency just now.

In electing in what state money may be lent upon mortgages reference should be made—

1st. To the credit of the state itself.

2d. To the state laws for the exemption of homesteads from attachment or stay laws affecting the collection of debts.

In a large portion of the states of this country the lesson has been learned that a good public credit is necessary to a sound private credit, and that it is as much for the interest of the debtors that creditors should be protected by judicious acts for their security as it is that their own rights should be sustained. It is unfortunate for them, however, that in some states a high rate of interest may be promised, but in case of default it may be very difficult to recover the principal. There may be nothing safer than a farm mortgage in a well-ordered state; there may be nothing more unsafe than a farm mortgage in a state in which it is still assumed to be cheaper *not* to pay under certain conditions than it is to pay ones honest debts.

Admitting, therefore, that ill-managed farms, great and small, have failed to be profitable; that the present conditions call for close economy, and that mortgages entered into for speculative purposes may have "eaten up" the profits of farming; nevertheless, the general conclusion must, I think, be admitted that the western farmers are as a rule in a sound and prosperous condition, and will continue to supply Great Britain with all the wheat she may require at present prices, if no more can be obtained or if a better use for the land cannot be found in substituting some other crop.

The question of cost in producing wheat has been mainly treated by my critics from the standpoint of English farming. This is a mistake on their part. The small farmers of this country, who number between 4,000,000 and 5,000,000, nearly all own their own land. As a rule they raise mixed crops, among which come what are called their *cash* or *money* crops. In one section this cash crop is cotton; in another it is meat; in another it is wheat. The sum received for this part of their crop goes into the profit and loss account of the farm; it may be all profit, or it may be in part profit. On the basis derived from farms or plantations operated on the "all-cotton," or "all-wheat" method, as they are called, on figures only it might be proved to be impossible to produce either the cotton or the wheat at the prices at which they are sold; but it is also about as impossible to assign any specific cost to either when they constitute a part of a crop of mixed farming. Whatever sum the wheat or other cash crops bring, they constitute the principal source of money to the farmer from his mixed crop; therefore, in the face even of declining prices and increased wages, the application of science and invention, of better machinery, of better methods, and of more intelligence have kept the country prosperous, and as a rule have brought or may bring the farmers out of debt in a very short term of years.

It is interesting to observe in the reports of some of the older land mortgage companies that many of the farmers to whom their money was lent at high rates of interest in the early period of their history in Ohio, Indiana, Illinois and Michigan are now lending their surplus profits derived from farming at much lower rates to the newcomers or the pioneers of the wheat-producing territory of Kansas, Nebraska, Minnesota and Dakota.

The measure of land required for the wheat crop may be computed from this fact. The territory of Dakota, which is not yet admitted as a state, covers about 150,000 square miles. All the wheat which is consumed by the people of Great Britain and Ireland, say 200,000,000 bushels or 25,000,000 quarters, could be produced from less than one-sixth part of the area of this one territory, at the average of its present product per acre on its good lands.

It has been alleged that this land is being deteriorated by constant cultivation. On this point more information is required. The reports which I have thus far received from farmers indicate that a single summer fallow, or the planting of a single renovating crop (vide Letter II.), has up to this time sufficed to restore the fertility of this enormously deep and finely-pulverized soil.

I may venture to call attention to the fact that this is no new subject to myself. In the *Fortnightly Review* for July, 1880, will be found an article upon "The Railroads of the United States and Their Effect upon Farming in Great Britain." In this article I treated the various forces which could then be witnessed in the beginning of their action, tending toward cheap bread for the multitude. After designating the changes which were in progress in the production and distribution of wheat, I used these words: "*Although all the elements of the problem are thus undetermined, one proposition may be stated dogmatically, to wit: That there are many parts of this country where wheat will be raised in increasing quantity at and above fifty cents per bushel, whence it can be carried to Liverpool at fifty cents or less, and landed at thirty-four shillings per quarter.*"

In a pamphlet edition of this article, printed at a little later date, when the report of the English commissioners—Messrs. Pell and Reed—had just been made, to the effect that the competition of the United States might not be feared, yet hoped for, in England at anything less than 48s. per quarter, I stated that they would have been more nearly right had they fixed the possible point at one-halt that sum, or 24s. per quarter. The price at 50s. per quarter yields a trifle over $1.50 per bushel in American money; 34s. yields a fraction over $1 per bushel, and 25s. yields 75c.

I now venture to repeat the proposition made in July, 1880, slightly changed, to this effect: *That, although the elements of the present problem are to some extent undetermined, one proposition may be stated dogmatically, to wit: That there are parts of this country where wheat may be raised in increasing quantity at and even below forty cents per bushel, whence it may be carried to Liverpool at thirty-five cents per bushel, where it may be landed at a cost of not exceeding twenty-five shillings per quarter, or seventy-five cents per bushel.* I do not submit this as a probable price under future conditions, but I submit the proofs that it is not impossible of being realized. We can probably do better with land, labor and capital, in some other pursuit.

In this treatment of the wheat question I have considered only the moving of wheat by all-rail routes from what are now the central wheat-growing sections of the United States, 1,500 miles from the seaboard, taking no consideration of the crops of Oregon and California in the far west which are moved from the western coast by sea. Neither have I given any consideration to the movement of wheat to the eastern seaboard by canals or other waterways, for the reason that so large a portion of the grain and flour is now moved by rail as to make it immaterial whether or not a part is moved by canal. The New York Central & Hudson River Railroad pays annually in taxes to the state of New York a sum equal to that which the state of New York expends in maintaining the Erie canal for the transportation of merchandise *free from tolls;* yet it is the New York Central Railroad by which the greater part of the grain is moved, and not the Erie canal.

The day of canals has substantially passed in this country, and we cannot help wondering at the undertaking to open a canal from the Mersey to Manchester.

Among the factors which may, however, be added to those already named, sustaining the proposition that wheat may yet be sold in Liverpool or London at 25s. per quarter with a remuneration to the American farmer equal to that which he now receives at about 31s. to 32s., the great changes in river and lake traffic and in the waterways of Canada as well as of the United States may be considered, and the future traffic from Duluth on Lake Superior by way of the lakes, rivers and canals connecting them.

I trust that in this communication I have defended myself adequately against the imputation of having submitted statements to the British Association for the Advancement of Science which could not be justified by actual proofs.

These statements have been designated by one or two of your correspondents, first, as examples of "American spread-eagleism"; afterward, that term having been withdrawn, they have been considered as something in the nature of "bragging" statements. It had not occurred to me when treating the interdependence of the English-speaking people that there was anything for one branch of the race to "brag" of or to "boast" of in the facts presented. May it not rather be a cause of grateful thanksgiving that by the combination of English and American applications of science to agriculture and to distribution a sack of flour can be moved from Minneapolis, 1,400 miles from the seaboard of the United States, to Liverpool or to London at a charge which comes to less than 18c., or 9d., per bushel of wheat. Is it not a matter of interest to the bread-winners of Great Britain that in their quartern loaves of four pounds each the cost of moving the flour 4,000 to 5,000 miles is but a fraction over a ha'penny? May not both branches of the English-speaking people unite in the common boast that the wages of one day's work of a good mechanic on the eastern seaboard of the United States will suffice to move his year's supply of grain and meat 1,000 miles from the far-distant prairies of the west, while the skilled workman of Great Britain may also move his year's supply of grain and meat 4,000 or 5,000 miles at a cost of two days' labor, possibly of three? The flour required for 365 loaves of bread of four pounds each can now be moved from Minneapolis, where the Pilsbury Mills grind 10,000 barrels or sacks a day, to London for less than 16s., or $4. Have not the scientists who have eliminated time and distance made the whole world one great neighborhood in which each man may serve his neighbor?

But the masters of physical science have only removed natural obstructions; there is work now for the masters of political science. It now remains for legislators to remove the artificial obstructions created by their predecessors in order that each nation may serve the other. When that is done the interdependence of the men of all countries and of all climes will be established, and the foundation of peace, order, industry, good-will and plenty among all nations will be firmly laid.

Then it may happen that the prophetic vision of your own great statesman will be realized, "when the ships which pass between this land and that shall be like the shuttle of the loom, weaving the web of concord among the nations."

I am indebted to the following gentlemen for the data on which this compilation has been made, and I cite them as authority for the facts given, each in his own department:

Hon. Chauncey M. Depew, president of the New York Central & Hudson River Railroad; Charles A. Pilsbury, Esq., of Minneapolis, Minn.; J. Russell Parsons, Esq., of the W. A. Wood Mower and Reaper Co., Hoosic Falls, N. Y.; Henry V. Poor, Esq., editor of *Poor's Railway Manual;* the Commissioner of Agriculture of the United States; The D. M. Osborne Co., of Auburn, N. Y.; the Statistical Department of the New York Produce Exchange; the editor of BRADSTREET'S, New York; the *Northwestern Miller*, Minneapolis, Minn.; the *American Miller*, Chicago, Ill.; the *Farm Implement News*, Chicago, Ill.; the managers of fifteen land mortgage companies. Also many other correspondents, especially farmers of repute, in various parts of the country.

EDWARD ATKINSON.

Boston, Mass., U. S. A., January, 1888.

II.

To the Editor of BRADSTREET'S.

DEAR SIR—I might, perhaps, rest the proofs of the possibility of an abundant supply of wheat at very low cost, with the correlative high wages or earnings to the farm laborers, coupled with reasonable profits to the farmers, millers and transportation companies, at the point where I left it in my first letter; but there are a few more facts which may not be without interest either to American or English readers.

I have stated that a large part of our wheat crop is the product of a system of mixed farming. In many, perhaps in most cases, meat, or milk for conversion into butter and cheese, are among the other products. As great a change has occurred, or is occurring, in the production of these latter products as in the case of the production of wheat. With respect to dairy products the general adoption of the butter and cheese factory may be named, bringing economy into the manufacture of butter and cheese, better conditions, and better prices for the milk to the farmers.

But there is a yet more important fact to be considered. With the exception of the extreme northern part of the wheat-producing area of this country an alternative crop of maize or Indian corn may be raised. It has become probable, if it has not yet been conclusively proved by Prof. William O. Atwater, of Middletown, Ct., in his investigation ot the Indian-corn plant, that it may be included as a renovating crop with buckwheat and clover of the north and the cow-pea vine of the south, each deriving its nitrogen from the atmosphere. It has been conclusively proved by skillful farmers who have adopted the plan of feeding their stock with ensilage made from Indian corn, that the meat and milk may be removed from the farm, but if the manure derived from the stock be restored to the soil it will not only maintain the fertility of the corn field, but it will yield a surplus over to be applied to other parts of the farm. If, then, the corn crop requires no expensive nitrogenous manure, but can be sustained by the application of cheap phosphates and potash, it follows that the semi-barbarous method of raising cattle on far-distant ranches must soon yield to a system of intensive farming under which there is scarcely a single state within the limits of the United States which may not supply itself with its own beef and dairy products, either from its own land not yet under cultivation, or, in some of the eastern parts of the country, by restoring farms to cultivation which have been deserted for the more fertile lands of the west. This process in the renovation of deserted lands can now be witnessed throughout New England in its actual progress. In the state of Massachusetts, where 27 per cent. of the population in 1885 was of foreign birth (by foreign, meaning not born in the United States) and more than 50 per cent. was of foreign parentage, including those of foreign birth, the lands which the Yankees left a generation ago to develop the richer fields of the west are now passing into the ownership of Irish, German, French Canadian and other races.

This process has been greatly promoted by the common habit of depositing savings in the city and town savings banks which are scattered over the state. These banks, which are private trusts administered by unpaid trustees, are conducted by paid executive officers. Their aggregate deposits and accumulated profits in October, 1887, amounted to £60,000,000, or $302,948,624; divided among 945,333 depositors, at an average of $323 each. It will be observed that the depositors numbered 945,333 out of a population of about 2,000,000; or nearly every other person—man, woman and child.

A considerable portion of this money is lent on mortgage in small sums; thereby a very large proportion of the working people are enabled to become the owners of their own farms or dwelling houses. The beneficent influence of the private savings bank is therefore felt as much in the lending of the funds as in the inducement which it offers to the saving of small amounts. In this function of lending it becomes a constructive force, and is therefore greatly to be preferred to a government or postal savings bank, in which the earnings of the people are invested in the evidence of debt or the bonds of the nation. Such an investment would soon become impracticable in this country, as there will be no public debt in a few years' time; and even if there were, if the average deposits of the people of the country were equal per capita to that of Massachusetts the securities required for its investment would amount to $9,000,000,000, or three times the national debt of the United States at its maximum, in 1865.

We think our savings banks are a better investment than standing armies and navies.

My attention having been called to this subject of ensilage a few years since, I put to the farmers the conundrum which none of them could then answer very accurately: "What is the cost of producing a pound of beef?" One of my correspondents, Mr. Wm. H. Gilbert, of Richland, N. Y., intends to be able to answer this question with absolute certainty next year, when he will be able to send to market a considerable number of two-year old steers raised separately on his farm, mainly on ensilage, for conversion into beef. As an indication of his progress in this art I venture to give you his latest report, from an address to the Farmers' Institute of his county.

"Several years ago Edward Atkinson in an address said: .

" '*If I were to say to you that next to the abolition of slavery and the use of the railway and the steamship, the re-discovery of the method of saving green crops, called* ENSILAGE, *will prove to be the most important event in its effect on the material welfare of the present century, you may suggest that a commission of lunacy be appointed to examine the condition of my brain. And yet I venture to say so.*' That was a bold utterance, yet the facts now strongly corroborate the prediction.

"The past season over 500 silos have been built in the state of Wisconsin alone, and they have only just commenced. In the New England and middle states they have been used in a small way for the past eight years. Last year the number increased fully 25 per cent. The new converts are as enthusiastic over their silos as though they had really discovered something new and of great importance.

"The first thing for a farmer to do is to satisfy himself whether corn can be preserved in the silo and its feeding quality or value retained; that point settled, he knows what to do.

"If he concludes to build a silo he will want 250 cubic feet of pressed ensilage to winter a cow, and he can build on that basis for any number of cows. Less space will answer if his corn is well eared and at its best. I hardly dare estimate the amount of cattle food that an acre of good corn will produce. While cutting my ensilage corn last fall I weighed upwards of 100 stalks that weighed from six to eight pounds each. I weighed what came from one kernel of seed, and found fourteen and one-half pounds. The stalk that weighed eight pounds had five full ears, and was fourteen feet high.

"I give these figures to show what can be done with some of the large varieties of corn when properly cultivated.

"In August and September I fed about two acres of our state corn planted in hills three feet apart each way. The corn was cut and bound in bunches of two hills, and fed one bunch to each cow night and morning. I was surprised at the result. Within a week after I commenced feeding the corn my cows had gained over 25 per cent. in the yield of butter.

"I found that six hills would keep a cow a day, and by cutting one hundred hills in a row that I had an average of 4.60 ears of corn and a weight of ten and one-half pounds, and that an acre of perfect corn planted three feet apart each way would give me 4,730 hills.

"Six hills a day would keep a cow 788 days, giving her a daily ration of sixty-three pounds, including 27.60 ears. That corn would have an equal feeding value preserved in the silo.

"I will give you a few facts and figures in my experience:

"Having a light, sandy soil, one easily cultivated and well adapted to corn culture, I became an easy and willing convert to the ensilage system. From the first I concluded that if I got good nutritious food out of the silo I must first put it in; that the silo was to preserve food, not to produce it. I had learned by experience that green, immature sowed corn was not a profitable food for milch cows; hence it would make poor ensilage. Corn for the silo should be cultivated same as for the grain; the more perfect the plant the more profit it will give you. It should not be cut until it is well matured and at its best. Corn cut and put into the silo at that stage will make a food that will produce a first-class butter, or if fed for beef will give you the best quality.

"The sweetest ensilage I ever saw I made from a field of yellow flint-corn put into the silo whole when it was ripe enough to harvest for the grain. It was as sweet when taken from the silo as when it was put in. In fact it was a perfect sweet ensilage. The stock ate it all, and it was food that would make butter or beef.

"For the past three winters I have kept an average of three cows per acre with ensilage grown on land that would not produce an average of one ton of hay. The past season I had twenty-four acres of the large, southern white corn planted in drills three feet apart, that produced 19,072 cubic feet of pressed ensilage that will keep ninety cows seven months. Cows not giving milk will gain in flesh without other feed. I estimated, while cutting the corn, that I had at least fifty bushels ears per acre, about one-half of which was glazed.

"The estimated cost of fitting the land and cultivating the corn was $84. The actual cost of seed and harvesting and putting in the silo was $176.90—making a total cost of $260.90; or a cost in round numbers of $10.87 per acre; or of $2.90 for the principal ration of a milch cow; or a full ration for a dry cow for seven months, more than equal in feeding value to 4,200 pounds of hay.

"If the farmer will take his pencil and will figure a little he can easily find how much an acre of corn will cost him. If he has a good crop, and puts it in the silo, he will be surprised at the dividend the one acre of good corn will pay him."

Now, it will be very apparent to any one who gives due consideration to these facts that if a system of intensive farming can be applied to the vast portion of the area of this country in which Indian corn can be raised, or where maize and wheat are optional or alternate crops, and that by this method the production of meat and dairy products will yield such an excess of manure as may be required to maintain the wheat field, it follows of necessity that the cost of all these products, i. e., grain, meat and dairy products, will be reduced to a minimum which has not yet been attained with respect to either.

At the risk of crowding your columns yet more, I venture to give one more letter from a correspondent dwelling upon what is known as the "blue-grass" land of the middle south. Blue grass (*Poa pratensis*) thrives in Virginia and North Carolina, but especially in what is known as the "blue-grass section" of Kentucky. The soil of this section of the state is underlaid with rotten limestone, filled with flakes of soluble phosphate. A blue-grass pasture when cultivated and devoted to wheat will yield thirty bushels to the acre without fertilizing. If hemp be raised upon it for two successive years, and rotted upon the land, the next crop of wheat will reach fifty bushels per acre.

This part of the country is well known, but the *terra* almost *incognita* of this country is now to be found in the middle or mountain section of the south, embracing the Cumberland plateau on the west and the Piedmont plateau on the east of the great Apalachian chain. The potential of this section in the production of wheat, corn, wool and other products is as yet an almost absolutely unknown quantity.

Saltville is in a loop of blue grass land, in southwestern Virginia, near Kentucky.

"SALTVILLE STOCK FARM,
SALTVILLE, VA., February 9, 1886.

"*Mr.* EDWARD ATKINSON, *Boston, Mass.*

"DEAR SIR—I beg to acknowledge the receipt of your valued favor of the 2d inst., and also to thank you for the *Massachusetts Ploughman*. I have been very much interested in reading the discussion on the subject of the production of beef in New England and the east, and have long been of the opinion that it could be produced to better advantage and with better profit in the east than it could in the west, taking the price which it could be sold for, quality, etc., into consideration; and that it only needed the same kind of "brain and capital" that is engaged in the manufacture of cotton to demonstrate the fact.

"In reply to your questions: I am like most farmers; I do not keep my accounts enough in detail to enable me to say accurately what any one product costs. The farm that I have has 10,500 acres; about one-half in grass and cultivation. I made a crop of tobacco last year of 60,000 pounds. I have 2,800 sheep, 150 horses (mainly Clydesdales) and about 600 head of cattle, of which 450 are registered Shorthorns, being the largest herd of registered Shorthorns in the world. The cost of all are so blended that I cannot give you the exact figures for any one product, though I can give an estimate that is satisfactory to my own mind, but it would be more satisfactory if I could give you the cost in figures, the same as you can the cost of a yard of calico; but I will give you my estimate the best that I can.

"Question 1st. At what cost can you put good corn ensilage into the silo?

"Answer. I estimate that corn which will yield 60 bushels per acre will make 30 tons of ensilage per acre, and that it can be grown and put into the silo at $1.30 per ton.

"Question 2d. How many tons will carry a steer one year for green fodder?

"Answer. I think that 40 pounds (per day) is a large feed for a yearling steer, and 75 pounds for a two-year-old steer.

"Question 3d. What do you feed with the green fodder?

"Answer. This depends much on the kind of cattle, and how they are to be handled. If they are to go on grass in the spring, good sweet ensilage will keep them growing all winter; if they are to go to the butcher in, say, June or July following, I feed them all of the cotton-seed meal and corn (ground with the cob) that they can digest. Cotton-seed meal costs $20 per ton at this depot.

"Question 4th. At what cost can you make a steer ready for the butcher at twenty months old?

"Answer. Very much depends on the treatment and care of the feeder, and whether fed on grain and ensilage or partly on grass, as in this part of the country. A steer is simply a machine for making beef and fat; and you might as well undertake to run a large steam engine with little or no fuel as to make beef without plenty of food, and feeding it as carefully as you would feed an engine; and it will pay for attention as well as an engine. I estimate that I can make beef here of the best quality at 4c. per pound, live weight, and that it can be made in New England at 5c. per pound, and that the steer should weigh from 1,400 to 1,500 pounds at 20 to 24 months old.

"The making of beef is in its infancy in the United States, and, in my opinion, the eastern states will hold their own with the west as soon as more capital and brains take hold of the matter, as they have of other manufacturing interests. I believe that large sums could be made, and a better return on the capital secured, than in any other manufacturing business. Yours very truly,

"GEO. W. PALMER."

It may happen that this promised supply of bread, meat and dairy products at a diminishing cost will not be welcome to a small number of persons in Great Britain, however satisfactory it may be to the great majority. It will not, therefore, be amiss to call attention to some of the effects of the attempts which have been made on the continent of Europe to obstruct the import of food from this country.

In the year 1880, out of 17,500,000 persons who did the work of this country—mental, mechanical and manual—8,000,000 were occupied in agriculture or upon railroads in moving the products of agriculture to the points of wholesale distribution or of export. In that year $17^4/_{10}$ per cent. in value of the products of agriculture were exported, representing by ratio to persons employed over 1,400,000 farmers and railway employees who thus depended upon a foreign market for the sale of their products. In the present population of the United States, numbering over 60,000,000, doubtless 20,000,000 are occupied for gain, of whom at least 9,000,000 would be found engaged in agriculture or in moving farm products by rail to distributive centers. In consequence of the exclusion of our farm products from the continent of Europe our exports of food have fallen off materially; hence it has become necessary to find additional occupation in the manufacturing and mechanic arts; and as the home market was already fully supplied with such products as could be profitably made for use in this country, this force, whatever it may number, which has been diverted from agriculture to other arts by a check to our exports, an outlet has been found for the increased product of manufactured goods in the great increase in our exports of this class. Thus it happens that Germany, France and other continental states, by obstructing the import of food at low cost, have increased the cost of manufactures in their respective countries while decreasing the price of food to some extent in this country; and they have given a stimulus to the export of manufactures from this country in competition with themselves which might not otherwise have occurred so soon.

There is hardly any stimulus which could be given to the manufacture of goods in this country for export so great as that which would ensue from the imposition of duties on the products of our agriculture in Great Britain, where we find our principal export market.

The working of these forces is now being more fully comprehended in this country than ever before; hence the prospective reduction or abatement of the duties on crude or partly manufactured goods for use in our domestic manufactures imported into this country may presently give an additional stimulus to our export of manufactured goods by reducing the cost of the materials; the balance of our population, as between manufacturing and agricultural, will then be attained under more natural conditions than now exist.

In concluding this subject permit me to call the attention of those who have been unable to accept my general statements until they have been supported in detail with adequate testimony, coupled with the citation of competent authorities on every point, to the fact that this is a commercial age, in which the most important changes in the social system of nations may depend upon the fraction of a penny, which being considered by itself might seem to be an insignificant factor. For instance, what might have been the reply of any ordinary British observer in the year 1869 had any one then said to him in England, "If President Vanderbilt of the New York Central Railroad can reduce the cost of moving provisions a ha'penny per ton per mile on the consolidated railway line which he has just now organized between New York and Chicago, it will change all the conditions of agriculture and will profoundly affect the existing order of society in Great Britain."

There are six great railway lines which enter Chicago from the west; and there are twenty corporations which, consolidated under four systems, connect Chicago with the eastern seaboard. These twenty-six lines carry about one-half the whole of all the merchandise which is moved by railway in the United States. Their average charge from 1866 to 1873, inclusive, was 2.315c. per ton per mile. Their average charge from 1874 to 1885, inclusive, was 1.196c. per ton per mile. The difference is only 1.119c. per ton per mile, a fraction over a ha'penny. What of it? That simple statement would mean nothing except to one who has mastered the railway problem. In fact, it means this: Had the merchandise, consisting to the extent of more than one-half of the grain and other provisions which was moved over these lines in the second period, been charged the difference of 1.119c. per ton per mile above the actual rate which was charged, the sum of such additional cost to the consumers of the food, fuel, materials for clothing and shelter would have been a little over seventeen hundred and fifty-six million dollars ($1,756,000,000) or £361,317,000. Between 1873 and 1876 the average rate fell for the first time below 1c. a ton a mile east of Chicago. In that period the previous balance of trade was reversed; the United States afterwards became a creditor country on its merchandise account. From 1876 to 1885, inclusive, the excess of exports, chiefly consisting of cotton, provisions and grain, amounted to ($1,574,021,528), nearly sixteen hundred million dollars, somewhat less than the difference in the charge on one-half the railway traffic.

It may be assumed that an even greater reduction in the cost of moving merchandise occurred on the other half of the railway lines; or rather, that it first became possible to move products by railway by the extension or construction of these other lines. It has been on this ha'penny per ton per mile that the United States were enabled to resume specie payment in 1879, and out of the savings which have accrued from this gain of a little over 1c. a ton per mile in the railway service we have paid more than one-half of our national debt.

With this statement I leave the wheat question to the tender mercies of my critics, awaiting their further exceptions or interrogatories.

EDWARD ATKINSON.

Boston, Mass., U. S. A., January, 1888.